CLAIMS

1. Oil country tubular goods excellent in collapse characteristics after expansion containing, by wt%:

C: 0.03 to 0.3%,
Si: 0.8% or less,
Mn: 0.3 to 2.5%,
P: 0.03% or less,
S: 0.01% or less,
Nb: 0.01 to 0.3%,
Ti: 0.005 to 0.03%,
Al: 0.1% or less, and
N: 0.001 to 0.01% and

comprising a balance of Fe and unavoidable impurities, characterized in that a ratio of collapse pressure after expansion and collapse pressure before expansion is in the range of a/b: 0.85 to less than 1.0, where

a: collapse strength (MPa) after expansion 10 to 20% and b: collapse strength (MPa) of unexpanded steel pipe of same dimensions as steel pipe measured for a.

2. Oil country tubular goods excellent in collapse characteristics after expansion containing, by wt%:

C: 0.03 to 0.3%,
Si: 0.8% or less,
Mn: 0.3 to 2.5%,
P: 0.03% or less,
S: 0.01% or less,
Nb: 0.01 to 0.3%,
Ti: 0.005 to 0.03%,
Al: 0.1% or less, and
N: 0.001 to 0.01%,
further containing one or more of:
Ni: 1% or less,
Mo: 0.6% or less,
Cr: 1% or less,
Cu: 1% or less,
V: 0.3% or less,
B: 0.0003 to 0.003%,

Ca: 0.01% or less, and

REM: 0.02% or less, and

comprising a balance of Fe and unavoidable impurities, characterized in that a ratio of collapse pressure after expansion and collapse pressure before expansion is in the range of a/b: 0.85 to less than 1.0, where

a: collapse strength (MPa) after expansion 10 to 20% and b: collapse strength (MPa) of unexpanded steel pipe of same dimensions as steel pipe measured for a.

3. Oil country tubular goods excellent in collapse characteristics after expansion containing, by wt%:

C: 0.03 to 0.3%,

Si: 0.8% or less,

Mn: 0.3 to 2.5%,

P: 0.03% or less,

S: 0.01% or less,

Nb: 0.01 to 0.3%,

Ti: 0.005 to 0.03%,

Al: 0.1% or less, and

N: 0.001 to 0.01% and

comprising a balance of Fe and unavoidable impurities, characterized in that a ratio c/d of collapse pressure after expansion and ageing and collapse pressure before expansion is in the range of 1 to 1.2, where

c: collapse strength (MPa) after expansion 10 to 20% and ageing at 80 to 200°C and d: collapse strength (MPa) of unexpanded steel pipe of same dimensions as steel pipe measured for a.

4. Oil country tubular goods excellent in collapse characteristics after expansion containing, by wt%:

C: 0.03 to 0.3%,

Si: 0.8% or less,

Mn: 0.3 to 2.5%,

P: 0.03% or less,

S: 0.01% or less,

Nb: 0.01 to 0.3%,

Ti: 0.005 to 0.03%,

Al: 0.1% or less, and
N: 0.001 to 0.01%,
further containing one or more of:
Ni: 1% or less,
Mo: 0.6% or less,
Cr: 1% or less,
Cu: 1% or less,
V: 0.3% or less,
B: 0.0003 to 0.003%,
Ca: 0.01% or less, and
REM: 0.02% or less, and
comprising a balance of Fe and unavoidable impurities, characterized in that a ratio c/d of collapse pressure after expansion and ageing and collapse pressure before expansion is in the range of 1 to 1.2, where

c: collapse strength (MPa) after expansion 10 to 20% and ageing at 80 to 200°C and d: collapse strength (MPa) of unexpanded steel pipe of same dimensions as steel pipe measured for a.

5. Oil country tubular goods excellent in collapse characteristics after expansion as set forth in any one of claims 1 to 4 characterized in that said oil country tubular goods has a hot rolled structure comprised of a low temperature transformation phase of bainitic ferrite or bainite alone or combined.

6. Oil country tubular goods excellent in collapse characteristics after expansion as set forth in any one of claims 1 to 6 characterized in that a welded part is normalized or quenched and tempered.

7. Oil country tubular goods excellent in collapse characteristics after expansion as set forth in any one of claims 1 to 5 characterized by being used expanded in an oil well drilled into the ground.

8. Oil country tubular goods excellent in collapse characteristics after expansion as set forth in any one of claims 1 to 5 characterized in that a welded part is normalized or quenched and tempered and by being used

expanded in an oil well drilled into the ground.

9. Oil country tubular goods excellent in collapse characteristics after expansion as set forth in any one of claims 1 to 5 characterized by being used expanded in an oil well drilled into the ground and with a fluid of 80 to 200°C circulated through the well after expansion.

10. Oil country tubular goods excellent in collapse characteristics after expansion as set forth in any one of claims 1 to 5 characterized in that a welded part is normalized or quenched and tempered and by being used expanded in an oil well drilled into the ground and with a fluid of 80 to 200°C circulated through the well after expansion.

11. A method of production of oil country tubular goods excellent in collapse characteristics after expansion characterized by hot rolling a slab containing, by wt%:

C: 0.03 to 0.3%,
Si: 0.8% or less,
Mn: 0.3 to 2.5%,
P: 0.03% or less,
S: 0.01% or less,
Nb: 0.01 to 0.3%,
Ti: 0.005 to 0.03%,
Al: 0.1% or less, and
N: 0.001 to 0.01% and

comprising a balance of Fe and unavoidable impurities, coiling the strip at not more than 300°C, shaping the hot rolled steel strip into a tube as it is, then welding the seam.

12. A method of production of oil country tubular goods excellent in collapse characteristics after expansion characterized by hot rolling a slab containing, by wt%:

C: 0.03 to 0.3%,
Si: 0.8% or less,

Mn: 0.3 to 2.5%,
P: 0.03% or less,
S: 0.01% or less,
Nb: 0.01 to 0.3%,
Ti: 0.005 to 0.03%,
Al: 0.1% or less, and
N: 0.001 to 0.01%,
further containing one or more of:
Ni: 1% or less,
Mo: 0.6% or less,
Cr: 1% or less,
Cu: 1% or less,
V: 0.3% or less,
B: 0.0003 to 0.003%,
Ca: 0.01% or less, and
REM: 0.02% or less, and
comprising a balance of Fe and unavoidable impurities, coiling the strip at not more than 300°C, shaping the hot rolled steel strip into a tube as it is, then welding the seam.

13. A method of production of oil country tubular goods excellent in collapse characteristics after expansion as set forth in claim 11 or 12 characterized in that said oil country tubular goods has a hot rolled structure comprised of a low temperature transformation phase of bainitic ferrite or bainite alone or combined.

14. A method of production of oil country tubular goods excellent in collapse characteristics after expansion characterized by heating steel pipe comprised of the ingredients and structure set forth in any one of claims 11 to 13 to a temperature of the Ac_3 point (°C) to 1150°C, then cooling it in a range of 400 to 800°C at 5 to 50°C/sec.

15. A method of production of oil country tubular goods excellent in collapse characteristics after expansion as set forth in any one of claims 11 to 13

characterized by expanding the pipe by extracting a plug of a diameter larger than the inside diameter of the steel pipe.

16. A method of production of oil country tubular goods excellent in collapse characteristics after expansion characterized by heating steel pipe comprised of the ingredients and structure set forth in any one of claims 11 to 13 to a temperature of the Ac_3 point (°C) to 1150°C, then cooling it in a range of 400 to 800°C at 5 to 50°C/sec and expanding the pipe by extracting a plug of a diameter larger than the inside diameter of the steel pipe.